

UNITED STATES PATENT APPLICATION

OF

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FOR

WASHING MACHINE

[0001] This application claims the benefit of Korean Application(s) No. 10-2002-0074964 filed on November 28, 2002, which is/are hereby incorporated by reference.

BACKGROUND OF THE INVENTION

5 Field of the Invention

[0002] The present invention relates to a washing machine, and more particularly, to a washing machine having a means for preventing a lid frame having a lid from being incorrectly assembled to a detergent box.

Discussion of the Related Art

10 [0003] Generally, water and detergent are held in a tub of a drum type washing machine and a laundry is put in a drum inside the tub. The drum is then rotated to perform washing, rinsing, and dewatering.

[0004] The general drum type washing machine consists of a tub having an open front side to hold water and detergent, a drum rotatably provided in the tub to hold laundry, a
15 motor rotating the drum, a cabinet holding the tub and the motor inside, and a detergent box in the cabinet to provide the detergent to the tub.

[0005] A user has difficulty in putting an appropriate amount of detergent in the drum directly. Moreover, if the detergent is directly put in the drum, color of the laundry may be changeable. Hence, the detergent storing assembly is separately installed in an upper part of
20 the cabinet to allow the detergent to flow in the tub together with the supplied water.

[0006] Referring to FIG. 1, the detergent storing assembly consists of a detergent box 18 holding a detergent to provide to a tub in washing, a lid frame 22 fixed to an upper rim of the detergent box 18 to have an opening at a top for inputting the detergent, and a lid 24 hinge-coupled to the lid frame 22 to open/close a top of the detergent box 18.

[0007] The detergent box 18 is installed at a top plate 13, on which a control panel 13a for controlling a washing machine is installed, forming a topside of a cabinet of the washing machine and has a plurality of detergent storing parts 18a, 18b, and 18c to separately store detergent powder, fiber softener, and bleaching agent.

5 [0008] Specifically, the detergent box 18 is installed in a loading hole 13b formed at the top plate. For this, the detergent box has hooks 18d and 18f formed at front and rear ends. And, hook holes 13c and 13d are formed on an inner wall of the loading holes 13b to correspond to the hooks.

[0009] The lid frame 22 connected to the lid 24 is fixed to the above-constructed
10 detergent box.

[0010] The lid frame 22 is assembled to the detergent box 18 in a following manner. First of all, fitting protrusions 19 protruding upward from both upper sides of the front and rear ends of the detergent box are fitted to coupling protrusions 23 protruding downward from a bottom of the lid frame 22, respectively. And, the lid frame 22 is then fixed to the detergent
15 box 18 using screws S.

[0011] The lid frame 22 assembled to the detergent box 18 is loaded on the rim of the loading hole 13b at the top plate.

[0012] However, in the above-constructed detergent storing assembly of the drum type washing machine, a plurality of the fitting protrusions 19 formed at the upper front and
20 rear ends of the detergent box are formed alike as well as a plurality of the coupling protrusions 23 formed at the bottom of the lid frame are formed alike. Hence, the lid frame 22 may be turned by 180° to be incorrectly assembled to the detergent box.

[0013] To overcome such a problem, development of a washing machine having a structure enabling to prevent the incorrect assembly between the lid frame and the detergent

box is needed.

SUMMARY OF THE INVENTION

[0014] Accordingly, the present invention is directed to a detergent storing assembly
5 and washing machine using the same that substantially obviates one or more of the problems
due to limitations and disadvantages of the related art.

[0015] An object of the present invention, which has been devised to solve the
foregoing problem, lies in providing a detergent storing assembly and washing machine using
the same, by which a lid part and a detergent box constructing the detergent storing assembly
10 are correctly assembled to each other.

[0016] Additional features and advantages of the invention will be set forth in the
description which follows, and in part will be apparent to those having ordinary skill in the art
upon examination of the following or may be learned from a practice of the invention. The
objectives and other advantages of the invention will be realized and attained by the subject
15 matter particularly pointed out in the specification and claims hereof as well as in the
appended drawings.

[0017] To achieve these objects and other advantages in accordance with the present
invention, as embodied and broadly described herein, there is provided a washing machine
including a tub having an open front side to hold water and detergent, a drum rotatably
20 installed in the tub to hold laundry, a motor rotating the drum, a cabinet having the tub and the
motor inside, and a detergent storing assembly at the cabinet to provide the detergent to
detergent to the tub, the detergent storing assembly including a detergent box having an open
topside to store the detergent and to provide the detergent to the tub for washing, a lid part
fixed to the topside of the detergent box to open/close, and an incorrect-assembling

preventing means for leading the lid part to a correct position for a reciprocal assembling of the lid part and the detergent box.

[0018] The incorrect-assembling preventing means includes at least one guide protrusion protruding from a bottom of the lid part to interrupt the reciprocal assembling in case that the lid part is incorrectly disposed over the detergent box and at least one guide groove formed at a portion of the detergent box corresponding to the guide protrusion to have the at least one guide protrusion inserted therein.

[0019] Moreover, the incorrect-assembling preventing means may include at least one guide protrusion protruding from the topside of the detergent box to interrupt the reciprocal assembling in case that the lid part is incorrectly disposed over the detergent box and at least one guide groove formed at a bottom of the lid part corresponding to the guide protrusion to have the at least one guide protrusion inserted therein.

[0020] The lid part includes a lid frame fixed to the detergent box and having an opening at a center to put the detergent in the detergent box and a revolvable lid installed at one side of the lid frame to open/close the topside of the detergent box.

[0021] The lid frame is fixed to the detergent box by at least one screw coupled from a topside of the lid frame.

[0022] The lid frame includes coupling protrusions protruding from a bottom toward the detergent box to have cavities in an axial direction, respectively and wherein the detergent box comprises insertion protrusions protruding from a rim of the topside of the detergent box to be inserted in the cavities of the coupling protrusions and having screw threads inside to be coupled to the screws, respectively.

[0023] The lid frame includes a rectangular frame having a rectangular opening at a central part.

[0024] The coupling protrusions are formed at bottoms of a pair of long or short sides of the lid frame.

[0025] In this case, the incorrect-assembling preventing means includes guide grooves formed at inner walls of the cavities of the coupling protrusions at a pair of the long or short sides in different directions, respectively to interrupt the reciprocal assembling in case that the lid part is incorrectly disposed over the detergent box and guide protrusions protruding from outsides of the insertion protrusions in directions corresponding to the guide grooves, respectively.

[0026] Therefore, the incorrect-assembling preventing means enables to assemble the lid part to the detergent box correctly.

[0027] It is to be understood that both the foregoing explanation and the following detailed description of the present invention are exemplary and illustrative and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this application, illustrate embodiment(s) of the invention and together with the description serve to explain the principle of the invention. In the drawings:

[0029] FIG. 1 is a perspective view of a disassembled detergent storing assembly provided to a cabinet of a general washing machine;

[0030] FIG. 2 is a perspective view of a washing machine according to the present invention;

[0031] FIG. 3 is a cross-sectional view of a washing machine according to the present

invention;

[0032] FIG. 4 is a perspective view of a detergent storing assembly of a washing machine according to the present invention; and

[0033] FIG. 5 is a perspective view of a detergent box installed at a cabinet of a washing machine according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

[0034] Reference will now be made in detail to the preferred embodiment(s) of the present invention, examples of which are illustrated in the accompanying drawings. Throughout the drawings, like elements are indicated using the same or similar reference designations where possible.

[0035] FIG. 2 is a perspective view of a washing machine according to the present invention, FIG. 3 is a cross-sectional view of a washing machine according to the present invention, FIG. 4 is a perspective view of a detergent storing assembly of a washing machine according to the present invention, and FIG. 5 is a perspective view of a detergent box installed at a cabinet of a washing machine according to the present invention.

[0036] Referring to FIG. 2, a washing machine includes a cabinet 100 forming an exterior, an outer tub 300 provided inside the cabinet 100 to hold water and detergent, an inner tub 400 rotatably installed inside the outer tub 300 to hold laundry, and a motor 500 provided in rear of the outer tub 300 to rotate the drum 400.

[0037] A plurality of lifters 410 are installed on an inner circumference of the inner tub 400 to lift the laundry to a predetermined height when the drum 400 rotates.

[0038] The inner tub 400 holds the laundry, water, and detergent and constructs a washing tub together with the outer tub 300.

[0039] The cabinet 100 includes a cabinet body 110 having an open top and an open front side, a cabinet cover 120 coupled to the front side of the cabinet body 110 and having an entrance h via which the laundry is put in the drum 400, and a top plate 130 coupled to the open top of the cabinet body 110. And, a door 121 is installed at the cabinet cover 120 to open/close the entrance h.

[0040] A control panel 131, in which electronic parts for controlling an operation of the washing machine are installed, is installed on a rear part of the top plate 130.

[0041] And, a detergent storing assembly 200, which stores detergent inside so that water supplied via an inlet hose 140 flows in the outer tub 300 together with the detergent, is installed in a loading hole 132 formed rectangular in one side of the top plate 130.

[0042] Referring to FIG. 4 and FIG. 5, the detergent storing assembly 200 includes a detergent box 210 having an open topside and partitioned into a plurality of detergent storing parts 211a, 211b, and 211c to separately store detergent powder, fiber softener, and bleaching agent and a lid part 220 coupled to the open topside of the detergent box 210 to open/close.

[0043] The lid part 220 includes a rectangular lid frame 221 having an opening 221 long enough to let the various detergents put in the detergent storing parts 211a, 211b, and 211c and a lid 222 hinge-coupled to the lid frame 221.

[0044] The detergent box 210 is installed to be connected to the inlet hose 140 and supplies the detergent to the outer tub 300 via an inlet bellows 160 installed over the outer tub 300.

[0045] Specifically, the detergent box 210 has hooks 212a and 212b formed at front and rear ends to be assembled to the loading hole 132. And, hook holes 132a and 132b are formed on an inner wall of a rim of the loading hole 132 to correspond to the hooks 212a and 212b.

[0046] And, the lid frame 221 is assembled to the topside of the detergent box 210 by screws S.

[0047] For this, the lid frame 221 includes coupling protrusions 223a and 223b protruding from a bottom toward the detergent box 210 to have cavities in an axial direction, respectively. And, the detergent box 210 includes insertion protrusions 213a and 213b protruding from a top of a rim to be inserted in the cavities of the coupling protrusions 223a and 23b and having screw threads inside to be coupled to the screws S, respectively.

[0048] The detergent storing assembly according to the present invention further includes an incorrect-assembling preventing means 231 and 232 provided between the detergent box 210 and the lid frame 221 to enable the lid frame 221 to be correctly coupled to the detergent box 210.

[0049] The incorrect-assembling preventing means includes guide grooves 231 formed in different directions at inner walls of the cavities of the coupling protrusions, respectively and guide protrusions 232 protruding from an outside of the insertion protrusions in directions corresponding to the guide grooves 231, respectively.

[0050] In the present invention, the guide protrusions 232a and 232b protrude from outsides of a pair of the insertion protrusions 213b to confront each other, respectively, and the guide grooves 231a and 231b are grooves recessed at inner walls of a pair of the coupling protrusions 223b to have the guide protrusions 232a and 232b inserted therein, respectively when the lid frame 221 is assembled to the detergent box 210.

[0051] The guide groove 231 may be formed at one of a pair of the coupling protrusions 223b and the guide protrusion 232 may be selectively formed at one of a pair of the insertion protrusions 213b as well.

[0052] Of course, the incorrect-assembling preventing means 231 and 232 may

include at least one guide protrusion protruding from the rid part, and more specifically, from a bottom of the lid frame 221 and at least one guide groove formed at a portion of the detergent box 210 corresponding to the guide protrusion to have the guide protrusion inserted therein.

5 **[0053]** Moreover, the incorrect-assembling preventing means 231 and 232 may include at least one guide protrusion protruding from the topside of the detergent box 210 and at least one guide groove formed at a portion of the bottom of the lid part corresponding to the guide protrusion to have the guide protrusion inserted therein.

10 **[0054]** Namely, if the lid frame 221 is incorrectly aligned over the detergent box 210 such that the front or rear end of the lid frame 221 is horizontally turned by 180°, the guide grooves 231a and 231b are disposed over the front end insertion protrusions 213a so that the lid frame 221 is unable to be assembled to the detergent box 210.

[0055] An assembling process of the above-constructed detergent box 210 and lid part 220 is explained as follows.

15 **[0056]** First of all, the detergent box 210 is coupled to the inside of the loading hole 132 by the hooks 212a and 212b and the hook holes 132a and 132b.

[0057] And, the lid frame 221 connected to the lid 222 is coupled to the topside of the detergent box 210 by the screws S to enable to open/close the topside of the detergent box 210.

20 **[0058]** In this case, the insertion protrusions 213a and 213b formed at the topside front and rear ends of the detergent box 210 are inserted in the coupling protrusions 223a and 223b formed at the bottom front and rear ends of the lid frame 221, and the guide protrusion 232 is inserted in the guide groove 231. Once the screws S are coupled to the coupling holes (not shown in the drawing) of the lid frame 221, the detergent box 210 and the lid frame 221 are fixed to each other.

[0059] The washing machine having the above-constructed detergent storing assembly according to the present invention has the following advantages or effects.

[0060] First of all, when the lid frame is mounted on the detergent box to be assembled thereto, the incorrect-assembling preventing means prevents the lid frame from
5 being incorrectly assembled to the detergent box. Therefore, the present invention enhances assembling efficiency, thereby reducing assembling time and enhancing productivity.

[0061] It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the spirit or scope of the invention. Thus, it is intended that the present invention cover such modifications and
10 variations, provided they come within the scope of the appended claims and their equivalents.